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HARRY F. BENNETTS
Recently appointed Executive-Secretary N.L.G.I. (Story on Page 3)

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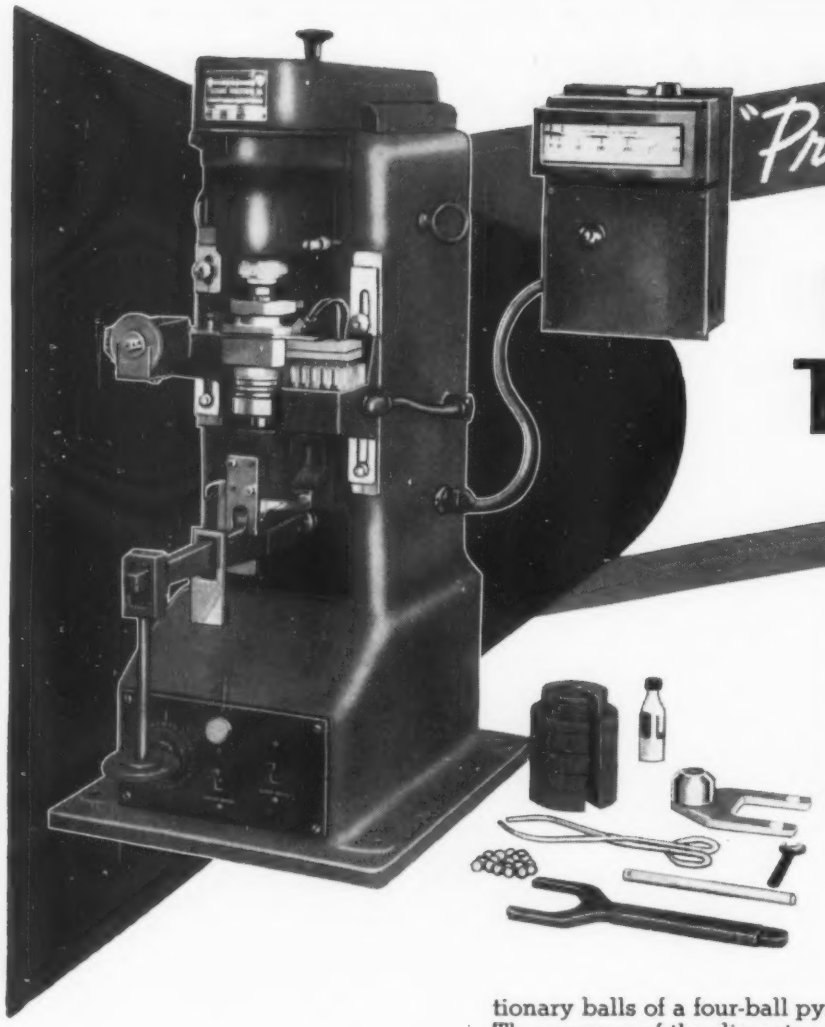

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NEW DIRECTOR ELECTED TO BOARD

B. C. Voshell Has Retired and is Succeeded by Paul V. Keyser, Jr.

PAUL V. KEYSER, Jr.

While attending the Board meeting on March 31, at the Blackstone Hotel, Chicago, Illinois, Mr. B. C. Voshell announced his retirement from the Socony-Vacuum Oil Company. His resignation was accepted with deep regret by the Board and his unexpired term of two years was filled by Mr. Paul V. Keyser, Jr., manager of the Lubricating Department, Socony-Vacuum Oil Company. Mr. Voshell is retiring to his "Isle of Rays Farm," Trappe, Maryland. Mr. Keyser's term of office on the Board will expire in October, 1950.

Since 1944, new Director Keyser has been Director of the Research and Development Department, Paulsboro, (Socony-Vacuum Oil Company), recently being appointed Manager of the Lubricating Department.

Mr. Keyser received the degree of Bachelor of Science in Chemical Engineering in 1929, and in the following year, his Master's Degree, also in Chemical Engineering, from the Massachusetts Institute of Technology. He began his career in the oil industry in the Greenpoint Laboratory of Socony-Vacuum Oil Company in 1930. In 1937 he became Assistant to the Director of the Technical Service Department, and in the following year he became Director. In 1943 he was transferred to 26 Broadway as Acting Assistant Director of Socony-Vacuum Laboratories, being transferred to Paulsboro in the following year. His office is now 26 Broadway, New York 4, N. Y.

The Institute extends its best wishes to Mr. Keyser in his new position on the Institute Board of Directors.

The INSTITUTE SPOKESMAN

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THE NATIONAL LUBRICATING GREASE INSTITUTE
HARRY F. BENNETTS ..... *Editor*
4638 Millcreek Parkway
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BOARD APPOINTS NEW EXECUTIVE SECRETARY

Harry F. Bennetts succeeds Carl E. Bolte as Executive Secretary of N.L.G.I.

The Board of Directors of the National Lubricating Grease Institute met at the Blackstone Hotel in Chicago, Illinois, on March 31, for the purpose of selecting a new Executive Secretary to serve this organization.

Of course, there was a group of applicants for the position, all experienced organization men in either Trade Association or Chamber of Commerce work. After carefully interviewing and reviewing each applicant, the Board decided that the position would be held by Harry F. Bennetts.

Mr. Bennetts comes to the Institute with considerable background of Trade Association work. For the past four years he has been Executive Manager of the Electric Association of Kansas City, a local organization composed of electrical interests in this trade area. Membership of this organization was approximately 850 members. During this time he also served for two years on the Board of Governors of the International Association of Electrical Leagues, an organization composed of all the Electrical Associations of the United States and Canada.

He is a gradute of the School of Commerce, Northwestern University, where he majored in finance—today he wonders at his youthful interest in this type of purely historical business. He has operated his own business manufacturing cellophane bags, and it was during this time that he had a rather varied experience in laboratory research developing his own types of adhesives for his enterprise. While in the manufacturing business he developed an overpowering curiosity concerning politics in general and city administrations specifically, which resulted in the ultimate sale of his business and direct participation in civic affairs when he was appointed Chief Investigator for Kansas City, Missouri, in 1940. Although none of you know him personally, you have probably met him in your local newspaper by reading the results of the famous Pendergast administration investigations in Kansas City. Many of these investigations were his or conducted by investigators working for him. His particular duty was to return property and

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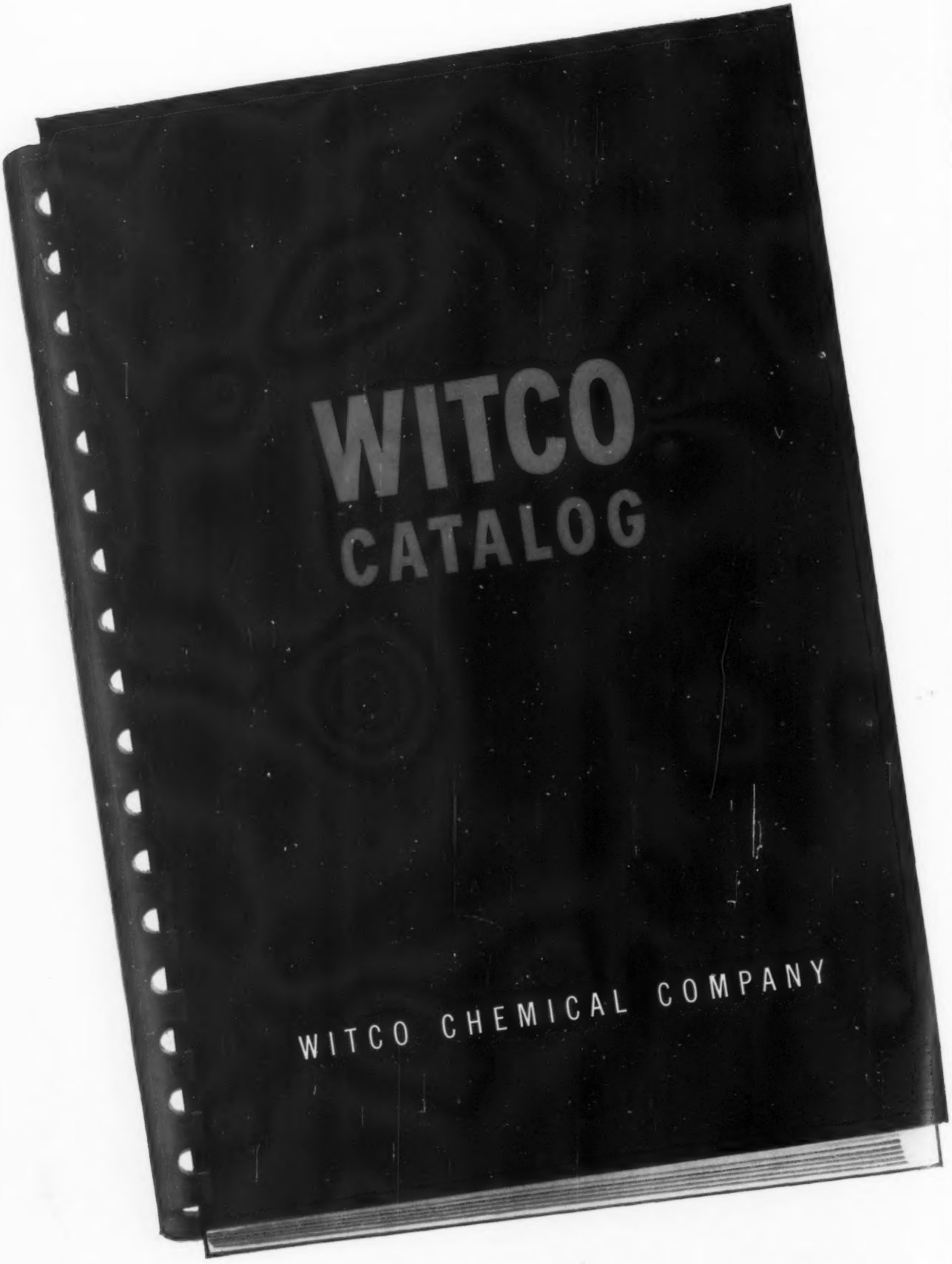

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BUY ON PERFORMANCE AND DEPEND ON BRANDS

by R. J. S. PIGOTT, Chief Engineer, Gulf Research & Development Company

Presented at American Petroleum Institute Annual Meeting
Chicago, Illinois, November 10-13, 1947

Specification of petroleum fuels and lubricants is an extremely elusive matter because the performance of these materials is by no means fully indicated by anything now usually put into a specification.

Table I shows the usual data furnished in connection with gasoline, fuel oil, lubricating oil, and grease. For gasoline, about the only items in this list that furnish much information bearing on performance are the distillation curve, which indicates volatility, and the octane number; or the octane number by the two methods, ASTM and Research, will indicate in a rough way about the general behavior. The vapor pressure is also moderately useful as indicating tendency toward trouble with vapor lock. Unfortunately, however, the octane number as normally given is now known not to be a full indication of the behavior of a gasoline in any particular engine. It has now been clear for some time that the variation in make-up of gasoline, that is

R. J. S. Pigott

shape of volatility curve, character of constituents, whether "sensitive" or "insensitive", affects the performance. The tetraethyl lead and sulfur amounts are only very general indications of what a gasoline is going to do because the same amount of lead has a different effect on gasolines of different make-up, and it is not known with certainty what the deleterious effect of sulfur may be.

In lubricating oils the carbon residue, corrosion, pour point, and neutralization number give only very moderate *indications* of what the performance of an oil will be in an actual engine. For greases, the amount of information that can be furnished by a specification is absurdly low. Melting point and penetration values obtained by penetrometer or consistency measurements are purely relative and do not tie in to any absolute values that can be calculated for anything. Finally, appearance and odor have a great effect on the customer but may have no meaning whatever in performance. For example, during the war some transmission oils and lubricating greases had a queer dark color. These materials had been proved good by performance tests. In many cases the men handling the oil took a look at the queer colored material, assumed it was no good, and drained it out of the vehicles and put in other material. A good deal of lubricating material was thus wasted. There is no question that the user often thinks in terms of a brand. For example, in the war certain makes of grease and lube oil had proved good in service, and the maintenance section looked for the same make regardless of other brands made under the same Army specification. They were not *sure* any of the others were as good, because they had no service proof, evidently feeling that the specification was no guarantee of performance.

In order to find out the real value of a fuel in a commercial product, it is necessary to do elaborate road testing or parallel it on specially designed dynamometers which will imitate road test conditions closely. It has been known for some time that the octane value of gasoline varies with speed and different gasoline having the same ASTM and Research octane number, both meeting a given specification, may differ very widely in their low speed and high speed octane value. Volatility can be quite a serious matter because it has become a habit to expect to start a vehicle on a cold winter day and drive off within 10 or 15 seconds and expect to have no trouble with bucking, flat spots, and failure to accelerate properly. The shape of the distillation curve of gasoline and the design of the engine, particularly with regard to manifold heat and manifold layout, are most important in determining how a given fuel will act under these circumstances. The 10% point in gasoline is most important in obtaining prompt starts; the 50-65% values indicate fairly clearly the length of time for full warm-up; and the 90% point affects warm-up slightly but indicates more about how much dilution is likely to occur. A further important variable is the engine design, which will give widely variable results on a given gasoline. It is only recently that a test procedure that qualifies the engine as to start and warm-up characteristics has been developed. It should be clear that once the gasoline is put together, its distillation curve is substantially fixed and if it is employed in engines sensitive to 10 and 50% point, either through low heat to the manifold or imperfect distribution, this gasoline will always act badly in such an engine whereas it may work very well in the bulk of the engines. But unfortunately, manufacturers must make gasoline that will not give trouble in the poorest designs. Even such a matter as mounting engines in vehicles, passenger cars or buses can make considerable difference in response of an engine to gasoline or lubricating

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oils. In the early days the design of rear mounted engines in buses brought in a good many headaches that had not subsisted when the engines were mounted in the front. The reason was chiefly that cooling and ventilation were considerably affected and many steps had to be taken to improve both when the engine was rear mounted. These things all affect the behavior of the gasoline or oil in the engine.

In fuel oils, the viscosity of the oil very definitely affects atomization and many of the nozzles on oil burners are designed so that the viscous effects are high. Most of the nozzles in household oil burners, for example, contain very small diameter passages close to the final orifice, which are intended to produce swirl in the spray, intended to increase turbulence and mixing. These small passages respond to viscosity as a first power function and consequently affect flow; the orifice itself being more in the nature of a disc orifice, is not appreciably affected by viscosity, but in all cases as viscosity increases the energy that must be put in the spray also increases to get the same fineness of atomization. The absolute value of these effects cannot be determined at all by specifications but must be obtained by performance test. Carbon-hydrogen ratios differ noticeably between straight-run and cat cracked fuels; cetane number, diesel index, specific gravity and perhaps several other properties of the oil have an effect upon the smoke produced in a given burner and boiler. There is, of course, a limit of permissible smoke both because the amount of solid particles affect washing, cleanliness of the house, and the accumulations in the boiler plug the passages and require cleaning out. The only way these effects are presently determinable is by a carefully controlled burner test imitating the actual operation of the burner in service. Here again the design of the burner affects conditions very noticeably because certain types have quite pronouncedly different characteristics. For example, the rotary wall flame burner performs best at fairly high CO_2, 12-13%, and will produce more smoke with larger excesses of air. Another type of rotary burner will not operate successfully above 9%. Most of the gun type burners, both high and low pressure will operate quite well up to 9% CO_2 and smoke heavily if the CO_2 is increased much above 10.5%. These are design effects and the only way the effects can be determined so the manufacturer and customer can both be safeguarded against trouble is by performance test. Distillation curve (volatility) is important for starting. Practically all the household burners on the market now start by electric ignition and conditions must be such that ignition is assured in a relatively few seconds. Again the only way to determine the range of satisfatcory CO_2 for a prompt start by way of actual burner-boiler test; the range in which satisfactory starts are obtained is generally not quite the same satisfactory range for smoke.

Referring again to Table I, about the only items that give much information as to performance of a fuel oil are carbon residue, copper strip corrosion, distillation, specific gravity and viscosity, and none of these give anything but *indications* of what the performance will be. Performance simply cannot be predicted from them. Again appearance, and in this case also odor, affects the customer appeal, although they have no meaning as regards performance. The stability of the fuel oil may be less with the cracked

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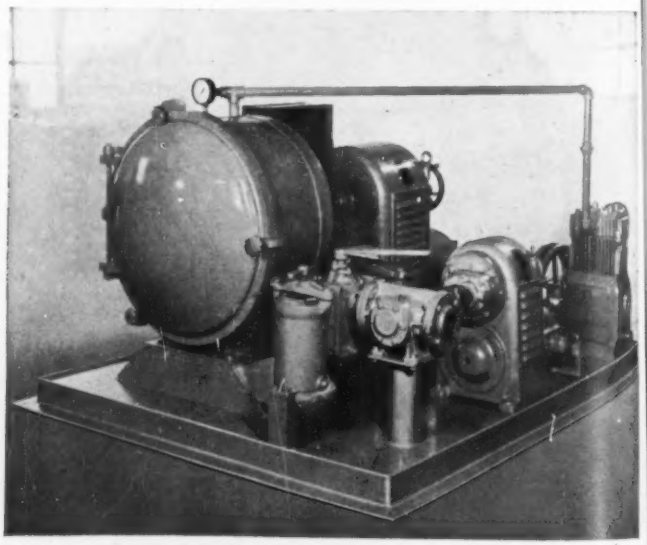

Grease Homogenizer, showing feed pumps, strainers and vacuum pump.

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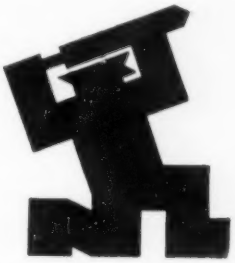

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(Continued from page 6)

terials which we know must be used for future, but they need not be, and we are finding out how to make the material as stable in the cracked as in the straight-run form. Curiously enough, reduced stability does not generally affect the burner directly but does give trouble with deposits in storage tanks, piping, screens and fittings on the way to the burner. Some of the most serious troubles with fuel oil have come from deposits in tanks. Again, elaborate tests for oxidation and other chemical change in storage must be set up to imitate actual service.

Referring again to Table I, in the case of lubricating oils the only items that give even an indication of performance are about the same as for fuel oil with viscosity index added. In bearing lubrication we have to know that the oil can stand the loads subsisting in the bearing at its operating temperature, and control corrosion, particularly of those bearing materials known to be sensitive to oxidation acids. We need likewise to know how the oil is going to produce ring belt deposits, knowing already from general experience that certain types of base stock have proved better in diesel engines of the automotive type because they burn off more freely and leave less deposits. Deposits of lacquer and varnish elsewhere on the engine, as on bearing surfaces, interior of crankcase, piston crown, etc., are important to operation, but very little indication is given by the usual specifications as to the behavior of an oil in this respect. Sludge in the crankcase we know is produced in several ways. There is winter sludge produced by low operating temperatures and water of condensat[ion] which does not seem to be affected [by] properties of the oil to any material [ex]tent, but other kinds of sludge are p[ro]duced by excess of oxidation produc[ts] which the oil cannot hold in suspensi[on] and the ability of the oil to hold th[ese] by-products in suspension is not ind[i]cated in specifications. We may assu[me] that the addition of antioxidants a[nd] detergents to an oil will reduce the form[a]tion of deposits, but we have no mea[ns]

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BUY ON PERFORMANCE AND DEPEND ON BRANDS

(Continued from page 8)

of knowing how much, without an engine test simulating service.

With regard to greases, Table I shows the usual information furnished and of these, only melting point and penetration are of much value in determining what the grease will do. Even these items, particularly penetration or consistency, are purely relative measurements. These measurements show only variation of one grease from another, and guarantee nothing about their performance in an application.

It follows from the foregoing that extensive test equipment either in special test designs arranged to imitate actual operation or field tests in commercial apparatus is essential to determine what the performance of any of these materials is going to be. The results of these tests do not appear in specifications, except in the case of some of the wartime Army specifications in which engine tests were part of the specification. At the present time we can see no way in which elaborate testing of this sort could be included in ordinary commercial specifications, but at least we shall probably find value in qualification tests involving this form of performance testing. However this kind of testing could not be done on each order but must be done for the whole production of the material. This implies at once the use of a brand as the only practical way of guaranteeing that these materials have been so tested when purchased in small lots.

To give an idea of what all this test equipment involves in money, a chassis dynamometer designed to do everything that can be done on the road in a test car.

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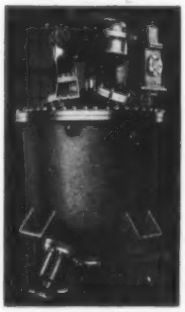

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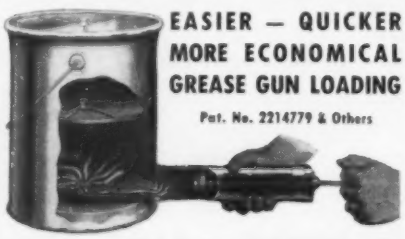

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"Technical Committee Column"

Since the second issue of this column, we have to report that the Panel working on the Committee's project entitled "Delivery Characteristics of Dispensing Equipment for Lubricating Greases" is preparing the agenda for the first meeting, which will probably be held in Chicago next month. There is still time, therefore, for any interested members to send to the Chairman of the Technical Committee any suggestions they may have regarding this project.

In the last issue of this column, a short outline was given on a Subcommittee of the ABEC-NLGI Cooperative Committee on Grease Test Methods. That Subcommittee is investigating the dirt count of anti-friction bearing greases.

Organization has almost been completed on another Subcommittee working on the problem of developing screening test machines. Interest in this project was prompted by recent experiences with ABEC's "Guide for the Selection of Lubricants for Ball Bearings—Section I—Greases." This guide now requires the use of a tester which is no longer being manufactured. Therefore, any laboratories not already equipped are in a difficult position when they are required to check products against the subject guide. Furthermore, it is realized that although the tester satisfied an important requirement when the guide was originally established some years ago, it is now out-of-date in certain important respects. The Subcommittee will review experience with that tester and investigate possible improvements from the bearing and grease manfacturers' viewpoints. The present membership of the Subcommittee is the following:

Mr. C. T. Hewitt, (Chairman)—Fafnir Bearings Corporation, Mr. C. R. Gillette, New Departure Division, General Motors Corporation, Mr. A. A. Kunzenbacher, Hyatt Bearings Division, General Motors Corporation, Mr. P. R. McCarthy, Gulf Research & Development Company, Mr. J. McGrogan, The Atlantic Refining Company.

Messrs. C. E. Morse and T. G. Roehner, as Co-Chairmen of the ABEC-NLGL Cooperative Committee, will also be active. Members of the NLGL Technical Committee are urged to send to Mr. Roehner any information or comments which they believe would be of assistance.

In the two previous issues of the Technical Committee Column attention was called to the fact that this column can be a convenient means for carrying on an open forum on the many problems facing the industry. It has been suggested that at least two of those subjects would bear considerable further treatment along these lines. For example, during the annual meetings of the Technical Committee there was considerable discussion regarding the practical significance of apparent viscosities and other data obtainable using the SOD Pressure Viscosimeter. It is certain that any contributions describing experiences where that information was utilized to solve service problems would be very welcome. Likewise, some further "give and take" regarding the merits of the present NLGL grease consistency numbers undoubtedly would be constructive.

Any comments on these two and any other subjects, for use in this column, may be sent to:

Mr. T. G. Roehner (Socony-Vacuum Laboratories, 412 Greenpoint Avenue, Brooklyn 22, New York); Mr. H. L. Moir (Pure Oil Company, 35 East Wacker Drive, Chicago 1, Illinois); Mr. W. H. Oldacre (D. A. Stuart Oil Co., Ltd., 2727 South Troy Street, Chicago 23, Illinois)—Chairman and Vice-Chairmen, respectively, of the Technical Committee.

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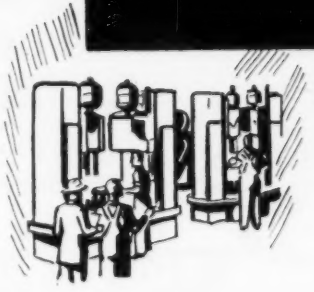

Engineered
APPLICATION SERVICE . . .

Cato's engineered application service assures proper application of all lubricants manufactured by the company. Cato engineers are waiting to serve you whenever difficulties arise . . . anxious to assist you in working out difficult lubrication problems.

CATO OIL AND GREASE CO., OKLAHOMA CITY, OKLA., U.S.A. MANUFACTURERS DISTRIBUTORS & EXPORTERS OF LUBRICANTS

BUY ON PERFORMANCE AND DEPEND ON BRANDS

(Continued from page 10)

The road test which was the original method of obtaining performance of gasoline is likely to be supplanted in the future by this type dynamometer because it eliminates accident risk and can be used in all weather.

It has been found that the pressure pattern of a piston ring on the walls of the cylinder may vary greatly around the circle; the object of design has been to get *uniform* pressure at all points. Many of our troubles with ring belt lubrication may stem from irregular ring pressure. This problem, by the way, is an extremely complex one involving something like about 20 variables in an actual engine; such items as speed, load on the bearing surface, alignment, temperature, character and finish of the two rubbing surfaces, and kind and viscosity of the lubricant are the major factors in determining behavior and they vary in every engine design. There are in use small bench test machines, such as the Falex, Timken, S.A.E., and Underwood, all of which give results of some value in determining the performance of the oil.

In the laboratory with which the writer is associated, the equipment for mechanical tests adds up to a cost of between $300,000 and $400,000 installed, and with the buildings necessary to house the equipment might amount to $1,000,000. This is heavy expense even for a large oil company, but it is absolutely essential in finding out what the products will do in actual service. None of the results obtained by such instruments just described are included in specifications, with the exception of Government specifications for wartime use, now employed to some extent commercially.

In the case of fuels, it seems that the gasoline produced by any company must serve the bulk of the poorest designs or in the poorest condition, and since octane demand of the engine varies with design, it can be seen that this may work quite a hardship on average production of fuel.

In the case of fuel oil, up to the present time the cracked fuel, which we know must be employed for the future, is generally of higher specific gravity for the same viscosity and has, up to very recently, been somewhat less stable; it usually requires changes in adjustment of the burners. There has been also, during the early period of use of the cracked materials, more deposits in the tanks and pipes, although these troubles are now largely being eliminated by improvement in manufacture of the fuel oils.

So far as diesel fuel is concerned, the very close clearances used in injectors make them very sensitive to varnish and lacquer deposits and before the cracked fuels can be generally employed for the more severe cases, the stability in this respect must be at least as high as for the former straight-run fuels.

The requirements on a lubricating oil vary greatly with operating condition. For a bearing that is in the equilibrium condition of perfect film lubrication, the only property of the oil that is important is viscosity, and therefore there would not be much opportunity for differentiating quality of oils if all bearings were run in this condition. The difficulties appear in such cases as starts and stops when imperfect film lubrication occurs, when oiliness and perhaps E.P. effects become of great value. Since every machine must be started and stopped, and in the case of piston rings the same condition occurs in normal running at both ends of the stroke, the lubricants must provide fully for this condition to be satisfactory. It is true, likewise, that the severity of temperature conditions in an engine varies greatly with design. For example, a hot piston design may produce heavy deposits on the under side of the crown and encourage ring belt deposits. The ring belt itself may vary in severity; tension, character of ring setup, and effectiveness

STEEL SHIPPING CONTAINERS
STEEL PAILS AND CANS

All Sizes—All Styles

We would appreciate your inquiries

Central Can Company, Inc.
2415 W. 19th STREET
CHICAGO, ILL.

of cooling from piston skirt, or jacketing, come into play. Of the rotating parts in the engine, the wrist pin and connecting rod are usually the severest because they are usually the most highly loaded. The proof of these facts lies in test experience which shows that a particular construction of test engine can be made to imitate other engines by applying heat to various points corresponding to their severe spots. The sum total of all this situation, however, is that an oil for general use must meet the requirements of all severe spots in all engines. Another design feature that will greatly affect the severity of conditions for an oil in the engine is the lubricating system used to distribute the oil from the pump to the bearings and the bearing grooving itself; these items affect the flow and consequently, since the oil is first a coolant for the rubbing parts of an internal combustion engine, affect temperatures of operation. Up to very recently little had been done on the subject, and this laboratory apparently took the earliest steps to rationalize the situation.[1] At the present time some bearing manufacturers are undertaking calculations of the same sort and the improvement of engine design ought to be, in this respect, noticeable in the future.

Varnish and sludge deposits elsewhere than in the ring belt will be affected by the severe spots in the engine, and as pointed out, these are apt to be the piston crown, valve chambers, piston skirts, and if jacketing is not perfect, may also appear in connecting rod and main bearings.

Grease lubrication, it must be admitted, is still in a highly empirical state. Not even the best chemist can be sure, after he has laid out a grease, what he will get in performance. Almost without exception the instruments now used for measuring the properties of grease do not give absolute data, only relative data from one grease to another. Recently the writer has pointed out[2] that the use of apparent viscosity of any plastic such as a grease, will permit calculation of performance of a bearing lubricated with this material, much in the same manner that can be done for a true liquid such as an oil. Test equipment is available and in use which gives us experimental information

1. Engine Design versus Engine Lubrication by R. J. S. Pigott, SAE Journal, May, 1941.

2. Some Test Equipment for Greases by R. J. S. Pigott, Presented at NLGI Convention, Chicago, October 17, 1947.

Penn-Drake

PETROSULS

Petroleum Sulfonates

The high quality and dependable uniformity of Penn-Drake PETROSULS insure complete satisfaction to the user of these modern products. Write for full information and specifications.

PENNSYLVANIA REFINING COMPANY

General Offices: BUTLER, PA.
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INTERNATIONAL LUBRICANT CORPORATION

NEW ORLEANS, U. S. A.

INTERNATIONAL LUBRICATION — QUALITY I SERVICE — L C — AROUND THE WORLD

MANUFACTURERS AND EXPORTERS OF LUBRICANTS

on channeling, feed of grease to bearing, stability, retention, separation, and similar mechanical properties; but with the exception of the instrument described in reference 2, none of these load the bearing and therefore do not tell how well the lubricant is serving the bearing. An unloaded rolling bearing presents almost no problem in lubrication.

For the protection of the customer as well as for his own protection, the manufacturer must obtain most of the above indicated performance data at quite high expense, both in equipment and labor. The only way in which a manufacturer can guarantee in general to a retail customer that he will get a definite quality of performance when he buys a product is by way of a brand name. The use of a brand fixes the product. The manufacturer has expended a great deal of money to find out in a lubricating oil, for example, how the inhibitor and detergent perform in the worst engines, what the best base oils and method of lubricating will be; all these data must be found and used to get best overall results. This expensive testing can be performed only for the product as a whole; it cannot be done for each retail purchaser. A change of product involves retesting to avoid a chance of spoiling performance. A manufacturer does not change the makeup of his product without very serious consideration and extensive testing. It therefore appears basic that the reputation of a brand is a most valuable asset to a manufacturer and is practically the only assurance which the customer has that he is getting a product having certain definite performance qualifications.

Until this situation can be changed, it appears desirable that the purchaser should always buy on performance since the specifications tell him so little, and for the present can tell him little more. Therefore, the purchaser should buy on brand, which is the means of guaranteeing performance.

TABLE I

SPECIFICATION TESTS

Gasoline
Aniline Point
Saybolt Color
Distillation
Specific Gravity
ASTM Gum
Copper Dish Gum
Army Gum
Reid Vapor Pressure
Lead
Sulfur
Octane Number
Lubricating Oil
Carbon Residue
Copper Strip Corrosion
NPA Color
Demulsability
Emulsability
Flash & Fire Point, open cup
Specific Gravity
Neutralization Number
Pour Point
Sulfur

(Continued on page 16)

STEEL DRUMS—PAILS
—for oil, grease, and other petroleum products
Made with a wide variety of spout openings and head designs including the E-Z seal lever locking ring cover. Special tested linings provided for high test aviation gasoline and many other sensitive products.

3 to 55 Gal.
INLAND STEEL CONTAINER CO.
CONTAINER SPECIALISTS
6532 S. Menard Ave., Chicago 38, Ill.

To Solve Lubrication Problems
send for a Swan-Finch service engineer
SWAN FINCH EST. 1853
REG. U. S. PAT. OFFICE
Swan-Finch offers a complete line of finest quality maintenance lubricants, cutting oils, core oils.
LATEST RESEARCH DEVELOPMENTS
FINE LABORATORY FACILITIES
Swan-Finch Oil Corporation America's Oldest Oil Company
New York Chicago Detroit
San Francisco

The FIL-RITE FOLLOWER PLATE

TRADE MARK REGISTERED

CONVERTS STANDARD GREASE PAILS INTO GUN-FILLING CONTAINERS . . . nothing else is needed

Cut Costs on

Warehouse Space
Inventory
Insurance
Handling
Bookkeeping

No special pumps, guns or buckets needed.

IMPORTANT
Make sure that this Fil-Rite Dust Cap tightly covers the Neoprene Gasket after filling your grease gun.
It is absolutely necessary to keep grease clean from sand, dust or dirt that ruins bearings, loses time and causes extra expense.

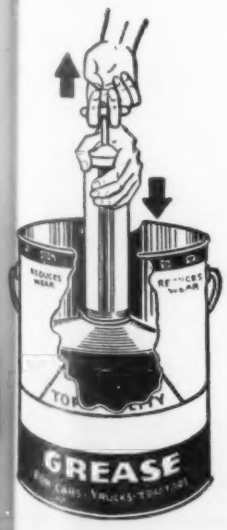
Pats. Applied for.

Customers Like **FIL-RITE!** • They will prefer your Grease when your Pails are equipped with FIL-RITE—everything else being equal. Farmers, Service and Repair Men, Building, Earth Moving, Road and other Contractors like **Fil-Rite** because with it they can fill Grease Guns easily, any time, any place and at any temperature. **Fil-Rite,** with Dust Cap, keeps grease **clean** and eliminates waste of grease. **Fil-Rite** saves time, space and expense for everyone, from the Distributor's warehouse on down to the Customer.

Full Information will be mailed upon receipt of Coupon

The FIL-RITE *Company*

342 LUMBER EXCHANGE DEPT. S MINNEAPOLIS 1, MINNESOTA



The FIL-RITE FOLLOWER PLATE is made in two sizes:

11 1/16" Plates for 11 1/8" Dia. pails

11 5/32" Plates for 11 1/4" Dia. pails

HOW FIL-RITE WORKS:

Place the open end of the gun on the Special Gasket. Push down on the barrel. Pull up on the handle. Over 1000 lbs. of atmospheric pressure on top of the Plate forces the grease into the Gun. It is filled completely. No air bubbles. No mess. No waste. Takes just a minute. And the grease is *clean* to the last ounce. *Fil-Rite* works at any temperature.

FIL-RITE

The FIL-RITE Company
342 Lumber Exchange, Dept. S
Minneapolis 1, Minn.

Kindly mail to me promptly full description and data on the FIL-RITE Follower Plate and FIL-RITE Dust Cap, together with prices; quantity.....

Name..... Title.....

Firm Name.....

Address.....

City..... State.....

We manufacture our Grease at.....

We buy our Grease from.....

BUY ON PERFORMANCE AND DEPEND ON BRANDS

(Continued from page 14)

Viscosity
Viscosity Index
Fuel Oil
Aniline Point
Ash
BS&W
Carbon Residue
NPA Color
Copper Strip Corrosion
Distillation
Flash Point, closed cup
Specific Gravity
Pour Point
Sulfur
Viscosity
Water
Grease
Melting Point
Penetration, worked
Penetration, unworked
Flow Point
Water
Viscosity of Oil
Soap Base
Gravity
Chemical Reaction

New Members-Welcome

American Cyanamid Company
30 Rockefeller Plaza
New York 20, New York
Mr. A. Scharwachter
Manager, Specialty Products Dept.

American Cyanamid Company was incorporated on July 22, 1907. Until 1916 it was principally engaged in the production of calcium cyanamide for use as a nitrogenous fertilizing material, at its Niagara Falls, Ontario, plant. Thereafter, and until 1928, the Company and its subsidiaries gradually extended their activities to other chemical fields. After 1928 the activities of the Company and its subsidiaries were considerably expanded and diversified, both through the acquisition of other businesses and through the expansion resulting from research and the development of new products. The principal offices of American Cyanamid Company are located at 30 Rockefeller Plaza, at New York City. Sales offices are maintained in industrial centers throughout the country.

American Cyanamid Company is now primarily engaged in the manufacture, in 36 plants and mines, and sale of a widely diversified line of chemicals and allied products, classified as follows:

Industrial Chemicals
Dyestuffs, Pigments and Intermediates
Synthetic Resins, Molding Compounds, Plasticizers, etc.

Agricultural Chemicals
Insecticides, Fumigants and Fungicides
Mineral Dressing Chemicals
Industrial Explosives
Pharmaceutical and Biological Products
Surgical Sutures and Ligatures

(Continued on page 18)

VULCAN STAMPING & MANUFACTURING CO.

Steel Shipping Containers

BELLWOOD, ILLINOIS

WHEN YOU'RE HAVING LITTLE PROBLEMS

OVER LUBRICATING GREASE

Since 1919

Manufacturers of Lubricating Greases of Merit

BATTENFELD
GREASE AND OIL CORP.
32ND & ROANOKE KANSAS CITY, MO.

KANSAS CITY, MO.
NORTH TONAWANDA, N. Y.
MINNEAPOLIS, MINN.

THEN BUY IT FROM BATTENFELD

...AND WATCH YOUR SALES INCREASE

YOU, TOO,

CAN INCREASE YOUR GREASE SALES

An increasing number of grease manufacturers the country over are doubling, yes, even trebling their grease sales with this new and sensational volume producer.

Easy for the operator to reach those hidden fittings—leaving one hand free to hold on. Any individual can do a perfect job with the Gre-zer-ator. Up high or down under, there is no awkward position for the Gre-zer-ator.
NATIONAL . . .
GRE-ZER-ATOR
NATIONAL SALES, INC. - WICHITA, KANSAS

By using the Grezerator as a special introductory offer you, too, can boost your grease sales. No special grease required—uses fluid or semi-fluid lubricants.

Write for Complete Information

Attaching the Gre-zer-ator to 25- or 40-lb pail is easily done without the use of tools.

To charge the cylinder and hose 'cock the gun' with one foot on the drum, then raise the cocking handle.

After charging cylinder and hose, squeeze lever handle. Develops over 5000 lbs. pressure.

NATIONAL SALES INC.

FOURTH NATIONAL BANK BUILDING WICHITA, KANSAS

New Members — Welcome

(Continued from page 16)

Engineering Services (design, supply and/or construction of chemical plants.)

American Cyanamid Company regards its research activities as extremely important. In addition to individual plant laboratories, and to important laboratories conducting research and development in specific fields at Bound Brook, N. J. and Pearl River, N. Y., the Company maintains its centralized Research Laboratories at Stamford, Connecticut. There new products are developed from the test tubes through the pilot plant stage, and problems of industry-wide importance are studied. Separate fully equipped units devote full time to research and development of chemicals and processes and their application to various industries. Among the products developed for the petroleum industry are chemicals for the treatment of the drilling mud used in rotary oil well drilling, cracking catalysts for the refining of petroleum, lubricating oil additives, antioxidants, and chemicals, such as metallic soaps, for the grease making industry.

ARMOUR CHEMICAL DIVISION
Armour & Company
1355 West 31st Street
Chicago 9, Illinois

Armour & Company, one of the nation's largest meat packers, has long been a pioneer in the development of new chemicals from Fats and Oils. At the present time the Armour Chemical Division, Armour & Company, 1355 West 31st Street, Chicago 9, Illinois, produces over 100 different chemicals from fats, and in addition the Animal Oils Division, Armour & Company, U. S. Yards, Chicago 9, Illinois, supplies some 20 different grades of Grease Oils, Neatsfoot Oils and Tallow Oils.

Many of the products supplied by Armour & Company have been developed especially to meet the needs of the Lubricating Grease Industry and an aggressive research program is maintained to insure a constant improvement in their products.

At the present time a complete new chemical plant scheduled for operation next year will replace present facilities. This new plant located on a 45-acre plot west of Chicago will provide greater capacity for present products and will make available many new products on which development work has been completed.

Major products of the Armour Chemical Division include a complete line of Fatty Acids (Neo-Fats), Abietic Acid, Fatty Acid Pitches, Fatty Amines (Armeens), Nitriles (Arneels), Amides (Armids), Quaternary Ammonium Salts (Arquads), etc.

GOLDEN BEAR OIL CO.
325 West Eighth Street
Los Angeles 14, California

The Golden Bear Oil Company is a California corporation, organized in 1931 and is engaged in the production, refin-

(Continued on page 20)

USACO
AUTOMOTIVE-INDUSTRIAL
AIR COMPRESSORS
HYDRAULIC LIFTS
LUBRICATION EQUIPMENT
AIR VALVES - COUPLINGS
DEPENDABLE EQUIPMENT
THE UNITED STATES AIR COMPRESSOR CO.
5300 HARVARD AVE., CLEVELAND 5, OHIO

Continuous, closed process revolutionizes Wax production

AT *Continental Oil Company's* Ponca City plant, these four VOTATOR wax crystallizing units deliver a continuous flow of paraffin wax at the rate of more than 40,000 pounds per eight-hour day. This is double the volume formerly achieved with roll-type equipment occupying about the same floor space, and the job is done with half the manpower formerly required. One man serves two VOTATOR units.

Completely closed, clean, automatic—VOTATOR apparatus turns out and packages uniformly crystallized wax at the critical temperature of 116° F.

Achieving a high overall coefficient of heat transfer, continuous, closed VOTATOR processing apparatus is equally successful with lubricating grease and other viscous petroleum products. Write to The Girdler Corporation, VOTATOR DIVISION, Louisville 1, Kentucky

DISTRICT OFFICES: 150 Broadway, New York City 7
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505 Forsyth Bldg., Atlanta 3, Ga.

Votator

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The Big News is
3
BALCRANK
LUBRICATING EQUIPMENT
BALCRANK INC. CINCINNATI 9, OHIO

ARO
AUTOMOTIVE, INDUSTRIAL
LUBRICATING
EQUIPMENT
"We Invite Comparison"
THE ARO EQUIPMENT CORP.
BRYAN, OHIO

They Believe You
when you
Recommend
QUAKER STATE
QUAKER STATE
OIL REFINING CORP.
OIL CITY, PENNA.
Member of Pennsylvania Grade Crude Oil Association, Permit No. 50

OIL MEN PREFER

INLAND STEEL CONTAINERS...

. . . because they are designed for petroleum products—have practical tight sealed closures yet are easy and convenient to use. The uniform, strong construction gives dependable safety in shipping. No leakage.

■ **Six popular containers for oils and grease are—1.** No. 5538 drum. **2.** No. 584R swivel spout pour pail. **3.** No. 1480W grease drum. **4.** No. 3½86 grease pail. **5.** No. 551B8 lever locking ring drum. **6.** No. 584 lug cover pail.

INLAND STEEL CONTAINER CO.
Container Specialists
6532 SOUTH MENARD AVENUE, CHICAGO 38, ILLINOIS
PLANTS AT: CHICAGO • JERSEY CITY • NEW ORLEANS

NEW MEMBERS — WELCOME

(Continued from page 18)

ing and marketing of petroleum and its products.

Its main refinery is at OILDALE, CALIFORNIA. This plant is the latest type of solvent refinery under patented process and manufactures a large variety of petroleum products, one of the principal being PREMIUM GRADE MOTOR OILS. It also refines and markets asphalts, fuel oils and a variety of Technical or White oils, and in addition a great number of petroleum by-products.

The company maintains a testing laboratory and a Research Department. It handles its own transportation through its pipe lines and its fleet of tank trucks; it owns and operates a plant in Los Angeles County. This plant manufactures greases and blends and packages lubricating oils. The company owns all of the lands upon which its plants are located, including a large Tank Farm for crude oil storage. Its products are not only sold in the United States but are exported to many foreign countries.

WITCO CHEMICAL COMPANY
295 Madison Ave.
N. Y. 17, N. Y.
Mr. Allen B. Craig

For over a quarter of a century, Witco Chemical Company has been supplying basic chemicals to American industries.

Witco Stearates for the lubricating grease industry are manufactured in Brooklyn and Chicago. Aluminum, barium, calcium, lithium, and lead stearates can be furnished, with special attention to each grease manufacturer's particular needs. Other Witco Stearates include magnesium, sodium, strontium, tin, and zinc. Up-to-date laboratory facilities are provided by Witco to work out "tailor-made" stearates for specific requirements. Lead naphthenate for extreme pressure lubricants is another Witco specialty.

Sales offices are located in New York, Chicago, Boston, Akron, Cleveland, Detroit, San Francisco, Los Angeles, and London and Manchester, England. Witco chemicals also fill the needs of the rubber, paint, printing ink, paper, ceramic, leather, cosmetic, drug, and plastics industries. The Pioneer Division furnishes asphalt and asphalt specialties for paving and roofing, as well as automotive specialties such as Witcote Sound Deadener and Vibration Dampeners.

WOOL GREASES
(Degras)
Common — Neutral — Lanolin
For All Purposes
Refined by
N. I. MALMSTROM & CO.
BROOKLYN, N. Y.

improved performance
MONSANTO OIL ADDITIVES
laboratory tested...field demonstrated

Monsanto Chemical Company
Petroleum Chemicals Department
1700 South Second Street
St. Louis 4, Missouri

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MONSANTO
CHEMICALS — PLASTICS

We introduce with pride

INLUCITE 21

AN UNEXCELLED MULTI-PURPOSE LITHIUM BASE LUBRICANT

The amazing multi-purpose lubricant found most satisfactory for war-time aircraft has been perfected for automotive, industrial and farm use. Inlucite 21 gives the service station operator, the industrial user, the fleet owner, and the farmer an ideal answer with one instead of many greases.

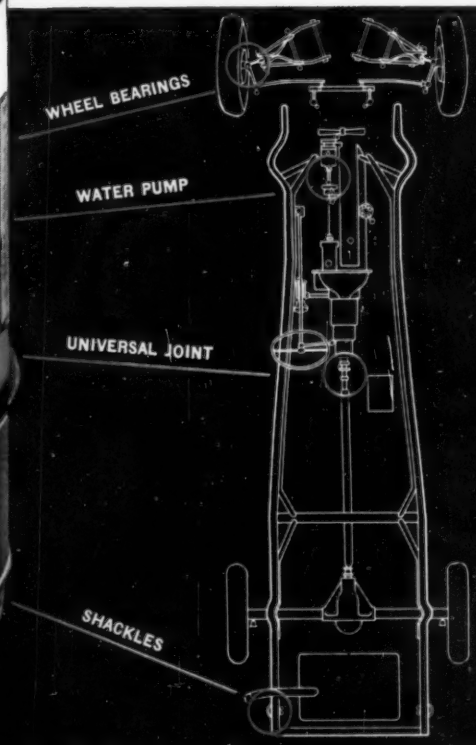
International Lubricant's research and development revealed lithium as a superior metalic base for greases.

Inlucite 21 withstands both low and high temperatures. It is water insoluble. It has been thoroughly proven in field service to have remarkable mechanical stability.

There is no better lubricant for use in: WHEEL BEARINGS, WATER PUMPS, UNIVERSAL JOINTS, SHACKLES, GENERAL INDUSTRIAL APPLICATIONS, INCLUDING ANTI-FRICTION AND SLEEVE-TYPE BEARINGS.

Inlucite 21 is made under our exclusive patented process.

INTERNATIONAL LUBRICANT CORPORATION
NEW ORLEANS, LA.
MANUFACTURERS AND EXPORTERS OF QUALITY LUBRICANTS
AVIATION-INDUSTRIAL-AUTOMOTIVE-MARINE



With Research Comes Quality, With Quality Comes Leadership.

BOARD APPOINTS NEW EXECUTIVE SECRETARY

(Continued from page 3)

funds to the city from sources who had misappropriated them. In addition to his civic work he later served as a special agent with the government. For a period during the War he was Technician for the Aluminum Company of America in their Kansas City plant.

In addition to his active management of the Electric Association, Mr. Bennetts has also attended the National Institute held by Northwestern University each summer for Trade Association and Chamber of Commerce executives. This work covered studies over three summers, and he now has a certificate from the University showing his successful completion of the prescribed courses.

Mr. Bennetts is married and has four children ranging in ages from 6 to 15. Outside his work for the Institute, his primary interests are his home and gardening.

The new Executive Secretary assumed his duties on April 12 with the full realization that his predecessor, Mr. Carl F. Bolte, had left a remarkable record of progress to emulate. Forward strides made by the Institute under Mr. Bolte have been remarkable in both magnitude and quality. It is with deepest regret the Institute views Mr. Bolte's resignation from active duty in the Institute office, but it is gratifying to know that he will still be affiliated with our industry as Vice President in Charge of Sales of the Battenfeld Grease and Oil Corporation, Kansas City, Missouri. Our industry can wish him no greater success in his new position than a repetition of the success he achieved as Executive Secretary of the Institute.

U·S·S Steel Drums
Painted · Galvanized · Tinned
Decorated · Stainless
U·S·S
Steel Pails
2½ to 6½-gallon capacities. Baked enamel finishes, in any color combination, or with lithographed heads or shells.
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UNITED STATES STEEL PRODUCTS COMPANY
30 Rockefeller Plaza, New York 20, N. Y.
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Chicago, Ill. · New Orleans, La. · Sharon, Pa.

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FOR
AUTOMOTIVE-INDUSTRIAL-FARM
LUBRICATION

- LUBRICATION FITTINGS AND HAND GUNS
- HANDLING AND TRANSFERRING EQUIPMENT
- POWER OPERATED LUBRICATION EQUIPMENT
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ALEMITE
division of
STEWART-WARNER CORP.
CHICAGO

AVIATION OILS AND GREASES

PETRO CHEMICALS AND WAXES

Be *sure* with Pure

THE PURE OIL COMPANY, U.S.A. — PURE

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AUTOMOTIVE OILS AND GREASES

INDUSTRIAL OILS AND GREASES

For a bag . . .

or a carload

# of Quality-Controlled Stearates

specify AERO* BRAND

No matter what your *quantity* needs are for *quality* stearates, you can increase grease-making efficiency and improve lube performance by specifying AERO BRAND.

You can always be *sure* that, in whatever quantity, AERO BRAND Stearates have been meticulously controlled and tested from raw material to finished product. For, American Cyanamid's large, new modern plant is operating at full-scale, large-batch production to meet demand for AERO BRAND Stearates.

AERO BRAND Stearates deliver on all counts.

*Trademark

SALES OFFICES: Boston, Mass.; Philadelphia, Pa.; Pittsburgh, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Cincinnati, Ohio; Chicago, Ill.; Detroit, Mich.; Kalamazoo, Mich.; St. Louis, Mo.; Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash. In Canada: Dillons Chemical Co., Ltd., Montreal and Toronto.

American
Cyanamid Company

Industrial Chemicals Division

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

STRATCO

PRESSURE SOAP CONTACTORS AND OIL CIRCULATION HEATING SYSTEMS

Make

SODA FIBER GREASE IN 2½ HOURS

Cut Costs---Increase Plant Production
Produce A More Uniform Product

Stratco Pressure Soap Contactors and Oil Circulation Heating Systems make possible the manufacture of soda fiber grease, from raw material to packaged product, at the rate of three batches in eight hours . . . cup greases at an even faster rate.

Simplified laboratory control . . reduced manpower requirements . . increased production of a more uniform product result. The Stratco process has been fully tested and proved in commercial operation.

STRATFORD ENGINEERING CORPORATION

PETROLEUM REFINING ENGINEERS

DIERKS BLDG. KANSAS CITY, MO.